Paper No. 6

TITLE: PHOSPHORUS AND MOLYBDENUM INTERACTION EFFECTS ON UPTAKE OF MOLYBDENUM BY BURLEY TOBACCO PLANTS

AUTHORS: F. Eivazi*, J. L. Sims, and J. E. Leggett

AFFILIATION: University of Kentucky, Department of Agronomy, Lexington, KY 40546

ABSTRACT: Burley tobacco (Nicotiana tabacum L. cv. KY 14) was grown in greenhouses during the spring of 1981. The purposes of the investigation were to evaluate the effect of P on Mo uptake by burley tobacco and to develop information useful in predicting the optimum level of P for Mo uptake. In Experiment 1, plants were transplanted to a greenhouse gravel medium using 1/2 strength Hoagland's solution. Experiment 2 was conducted in soil. The soil types used were Baxter (Typic Paleudalf) and Shelbyville (Molic Hapludalf). The soils were selected on the basis of their widely differing soil test P levels. In gravel culture a curvilinear relationship was observed between added P and plant Mo concentration. Phosphorus fertilization increased Mo uptake as much as two-fold in both leaves and stalks. In the absence of added Mo, application of P had little effect on concentration of plant Mo but P had large effects on Mo at high Mo rates. The highest value for dry weight resulted from the use of 5.4 meg P/1 and 0.63 µeq Mo/1 in the gravel culture experiment. Increasing rates of Mo and P increased uptake of Mo in both soil types. The relationship between added P and Mo uptake was curvilinear in Baxter soil (high soil test P) and linear in Shelbyville (low soil test P). Greatest uptake of Mo occurred in treatments receiving high applications of both P and Mo fertilization.

REVIEW: This paper illustrated the importance of the trace element molybdenum to burley tobacco plant growth. Phosphate addition to the phosphorus-rich soil (Baxter) had little effect on molybdenum uptake, but a large effect on phosphorus-poor soil (Shelbyville). In the greenhouse gravel medium (2250 g soil, 750 g sand), there was a two-fold weight gain in the plant with 2.4 mg added Mo after 15 days. With 2.4 mg Mo plus 200 mg P, an almost five-fold weight gain was achieved. No proposed mechanisms for the increased Mo uptake by the presence of P was attempted.

-Reviewed by C. Moogalian

1000816859

Source: https://www.industrydocuments.ucsf.edu/docs/nnnl0000